(12) UK Patent Application (19) GB (11) 2 236 467 (13) A

(43) Date of A publication 10.04.1991

(21) Application No 8922209.5

(22) Date of filing 03.10.1989

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(51) INT CL[5]
A01M 1/06

(52) UK CL (Edition K)
A1M MDB

(56) Documents cited
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(58) Field of search
UK CL (Edition K) A1M
INT CL[5] A01M

(54) Portable insect catching device

(57) A device for capturing insects comprises a body (30) with a recess of which the base is defined by a perforate surface (32). A fan (12) disposed behind the surface is operable to draw air into the recess and through the surface (32). A switch is provided for selectively activating the fan (12), which is preferably operable alternatively to discharge air through the surface (32).

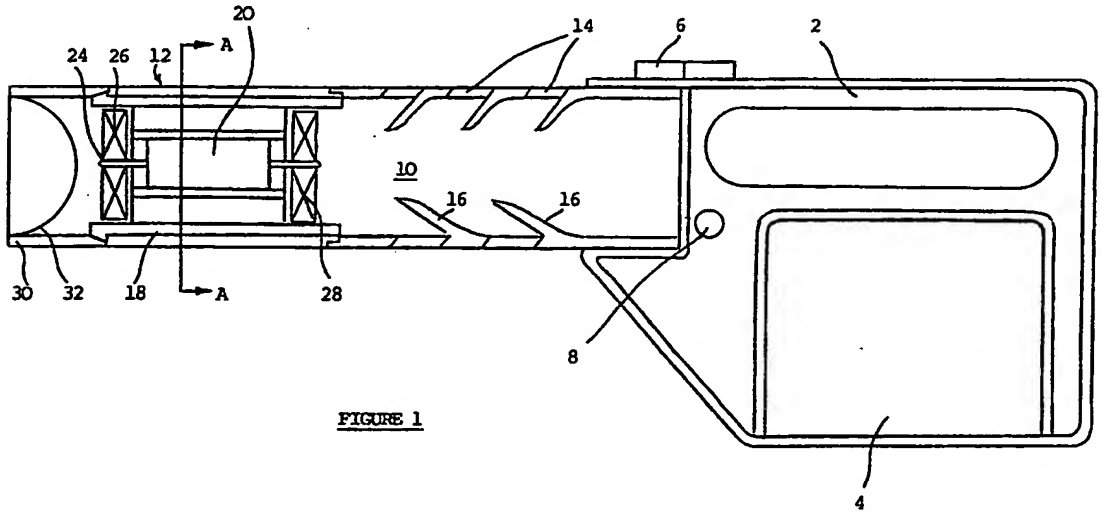

FIGURE 1

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1990.

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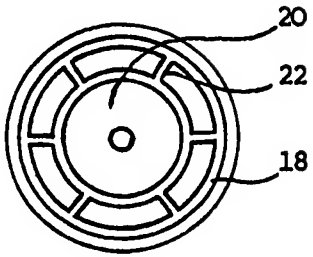

FIGURE 3

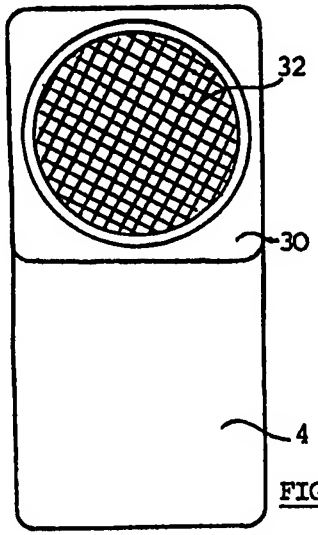

FIGURE 2

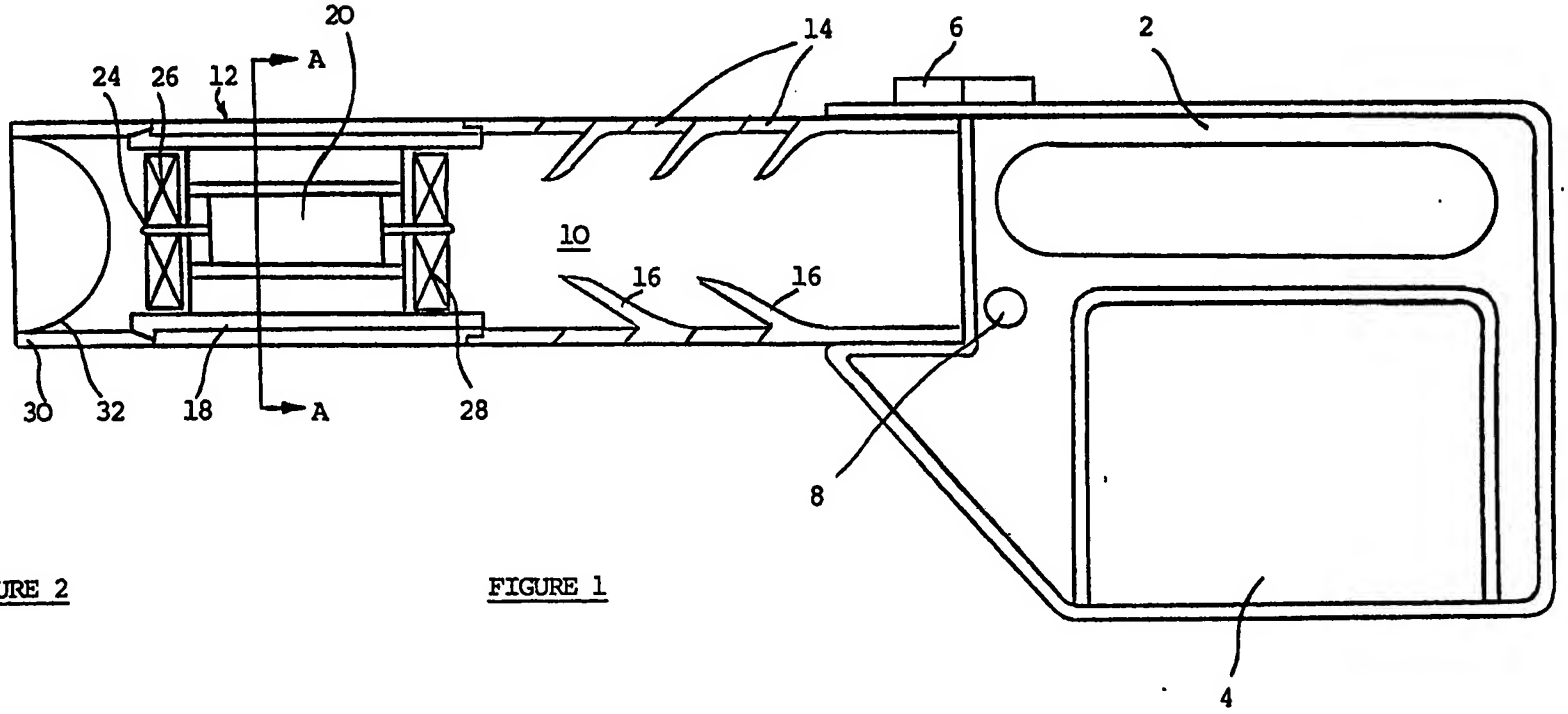

FIGURE 1

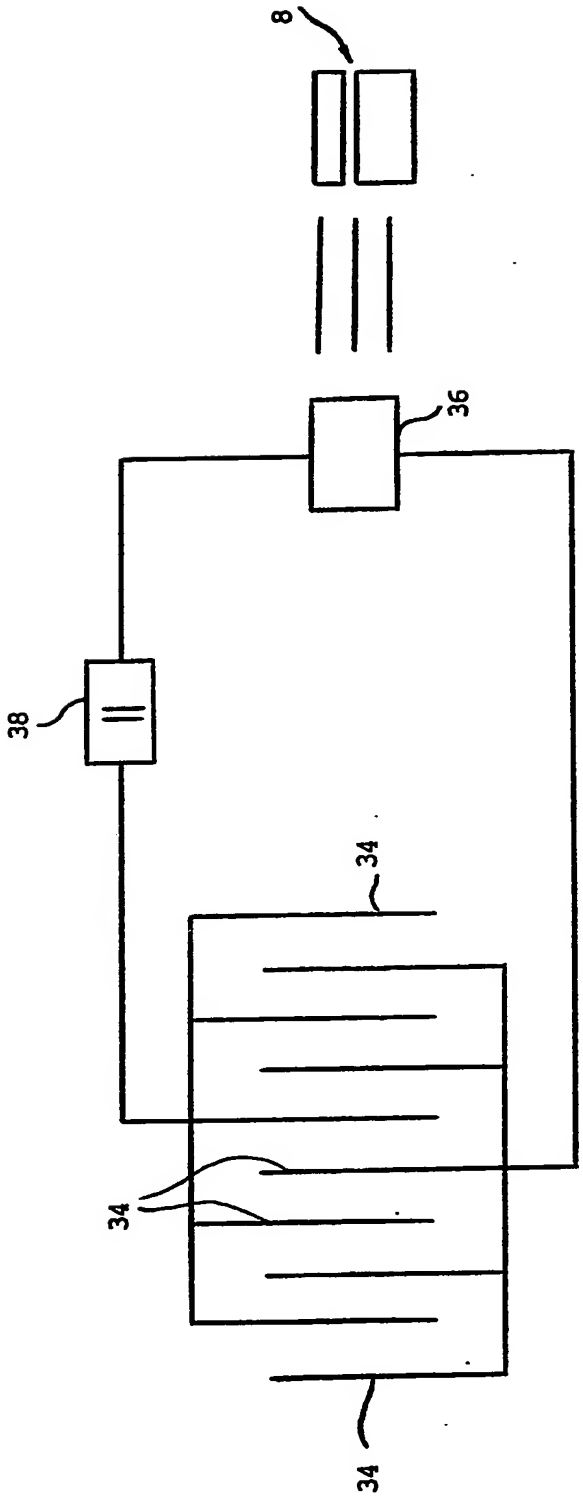

FIGURE 4

A DEVICE FOR CAPTURING INSECTS

This invention relates to a device for capturing insects, and more particularly to a portable such device for domestic use.

Generally, insects are a nuisance around the house and a variety of devices have been proposed for discouraging their presence and for killing them once they are there. Examples are fly papers, repellants of various kinds, and killer sprays, typically in aerosol form. Fly papers and killer sprays suffer from the disadvantage that corpses must be removed, while killer sprays and repellants often generate undesirable aromas in the region being treated. Further, none of these devices is wholly effective, and the use thereof to dispose of one or a small number of insects is not efficient.

The present invention is directed at a device which can effectively be used to capture and dispose of insects singly or in small groups which can be both effective and efficient without leaving insect remains or other physical evidence of its use. The device is a suction apparatus, and comprises a body defining a recess of which the base is defined by a perforate surface; a fan disposed behind the perforate surface and operable to draw air therethrough; and a switch for selectively activating the fan. The fan is typically driven by a electric motor powered by a battery mounted in the device, although other forms of motor might be used such as compressed air or CO_2 motors. The motor and power source are preferably mounted in the device so that it is fully portable, although it can be coupled to an external source or mains supply if desired. A particular preferred form of motor is a fractional horse-power electric motor coupled via the switch to a battery, which may be rechargeable, mount d in the body of the device.

The perforate surface in devices according to the invention defines a relatively large mesh to allow

relatively unimpaired flow of air therethrough. Typical mesh sizes will be up to 5mm, but 2 to 3mm is preferred. This size will ensure capture of most insects without the air path becoming clogged by entrained particulate or other matter. In some embodiments of the invention, the perforate surface is mounted in a component detachable from the body, and interchangeable with other components of similar construction or alternative components with perforate surfaces of different mesh size and/or different styles of recess.

In another preferred aspect of the invention, the fan is selectively operable in two modes; the first to draw air into the recess and through the perforate surface, thereby to draw insects onto the surface, and the second to expel air through the surface and from the recess to simultaneously discharge any insect captured therein. Thus, the device may be used in the first mode to capture an insect in one location, held thereon by maintaining operation of the fan in the first mode while the device is moved to another location such as an open window, and then to discharge or release the insect by switching to the second mode in which the insect is expelled. In this respect, the device may be used to dispose of troublesome insects without actually killing them. The power of the motor and the nature of the perforate surface can be selected such that an insect caught in the recess is not fatally compressed against the perforations.

Notwithstanding the above, provision can be made specifically for killing an insect caught in the recess on the perforate surface. Electrically conductive elements can be incorporated in the surface with electrical circuitry which enables a substantial potential to be applied therebetween to electrocute an insect held thereon. The electric shock delivered in this manner can be of very short duration, and the power therefor provided by a piezoelectric crystal mounted in the body of the device. A suitabl such crystal is a

barium titanate crystal which can be activated by the operation of a p rcussion button. Alternatively, the electric shock can be provided through a step up transformer from the power source fer the fan.

Behind the fan in devices of the invention, the body will normally have vents to enable the discharge of indrawn air. However, although designed as an insect capturing device, it can readily be adapted to act as a portable vacuum cleaner by introducing a porous chamber or bag between the fan and the rearward vents. Another application for the device is as a sieve or particle grader by the selection of suitable mesh sizes or using a sandwich arrangement which incorporates a series of graded mesh sizes to separate powders into different particle ranges. This variant is particularly suitable where the perforate surface is incorporated in a detachable component of the kind described above.

The fan of devices according to the invention can also be provided in the form of a separate module. The preferred form of fan comprises an electric motor with the rotor shaft extending from both axial ends. A fan is mounted on each shaft end and they are ideally oriented such that the blades of respective fans are out of phase; ie, with the blades of one fan disposed between the projection of the blades of the other fan onto its plain of rotation. This type of arrangement will define a chamber between the two fans which will be substantially evacuated by the downstream fan, thereby enabling the upstream fan to draw more air than would otherwise be possible. A similar effect might be achieved by two axially stacked motors. The desired fan speed will of course depend upon the dimensions of the device and the orientation of the fan blades. However, in a preferred embodiment of the invention where two fan blades draw air through a duct of up to 50mm in diameter, we have found a suitable fan spe d to be of the order of 20,000 r.p.m..

An embodiment of the invention will now be described by way of example and with reference to the accompanying drawings wherein:

Figure 1 shows a cross-section through a device embodying the invention;

Figure 2 shows a front view of the device of Figure 1;

Figure 3 shows a section taken along line A-A of Figure 1; and

Figure 4 shows a circuit matrix for incorporating the appropriate surface to provide for the delivery of an electric shock to the insect held thereon.

The device shown in Figure 1 comprises a moulded plastic body assembled from four separate components. A handle 2 is provided to enable the user to easily manoeuvre the device. The handle incorporates a battery compartment 4; pressure switches 6 for selectively operating the fan in suction and expelling modes; and a percussion button 8 for operating the electrocution circuit.

A coupling tube 10 is mounted on the handle 2 as shown and supports the fan module 12 at the distal end thereof. As can be seen, the tube 10 is formed with vents 14 and fins 16 to facilitate the discharge of air from behind the fan module 12.

The fan module 12 comprises a sleeve 18 supporting a motor housing 20 centrally within it by means of struts 22 (see Figure 3). The motor itself has a rotor shaft 24 extending from both axial ends thereof with a fan blade 26, 28 mounted on either exposed end. A typical diameter of the sleeve 18 is around 50mm, and with the diameter of the fan blades closely matched to the sleeve, the blades define therebetween a vacuum chamber of around 90mm in length.

Detachably mounted at the exposed end of the fan module 12 is th grid component 30. This component has a concav perforat surfac 32 mounted therein, which

typically takes the form of a substantially rigid net or mesh. As n ted above, a typical mesh siz is 2mm but this can be varied for different circumstances. The component 30 is detachable from the fan module 12, and the device may therefore be provided with a range of components 30 for use in different circumstances.

The mesh or perforate surface of component 30 may be adapted to incorporate electrical circuitry for killing insects held thereon. A typical matrix circuit is shown in Figure 4 in which interdigitated poles 34 are mounted on the exposed face of the mesh or perforate surface 32. These poles are connected to a suitable voltage discharge device 36 through a condenser 38 as shown, whereby the application of the voltage will generate a potential between the poles which will effectively electrocute or at least stun an insect held on the perforate surface and against the poles. As noted above, a suitable voltage discharge device is a barium titanate crystal which is activated to generate the required voltage by operation of the percussion button 8.

Details of the switches 6 and the percussion button 8, and of the wiring coupling these elements to the fan and matrix circuit respectively are not shown in the drawings. Neither are details of the mechanisms for assembling the device from the components specifically described. The components may be suitably marked to ensure their proper orientation in assembly, an appropriate circuitry may be moulded into the respective components to avoid the need for loose wires or other connections. This is particularly suitable for a modular construction, and enables the various components to be replaced or substituted without the simultaneous need to make fresh electrical connections. The design permits all the components to be separately replaced or substituted, and this is particularly beneficial if parts of differ nt overall size or shape are to be used. In addition to providing alternative forms of mesh components 30, a device according to the invention may

b provided with coupling elements 10 of various lengths. The normal length of a coupling element would be around 150mm, but l nger elements can be fitted to secure access to remote locations, or if the user prefers to maintain a greater distance from the insects to be captured.

In the use of the device, it is brought to a position at which the grid component 30 is about 7 to 8cms from the insect to be captured. At this distance most insects such as house flies and wasps will not sense the presence of the device. The appropriate switch 6 is then operated to suck air and the insect onto the surface 32. With the fan continuing to operate, and the insect retained on the surface 32, the device is moved to an open window for example, and the switch 6 operated to discharge air from the device and expel the insect from the surface 32. If it is desired to kill the insect, then the button 8 can be depressed while the insect is retained on the surface 32, but otherwise the same sequence is followed.

CLAIMS

1. A device for capturing insects comprising a body with a recess of which the base is defined by a perforate surface; a fan disposed behind the perforate surface and operable to draw air through the perforate surface; and a switch for selectively activating the fan.

2. A device according to Claim 1 wherein the fan is selectively operable to discharge air through the perforate surface.

3. A device according to Claim 1 or Claim 2 wherein the fan comprises a motor body with a shaft extending from both axial ends thereof, and a fan blade mounted on the shaft at each end of the body.

4. A device according to any preceding Claim wherein the motor is an electric motor and the body includes a compartment for housing a battery to be connected to the motor through the switch.

5. A device according to any preceding Claim wherein the perforate surface comprises electrically conductive elements, and where the device includes a mechanism for applying an electrical potential between adjacent elements, whereby an insect held against the perforate surface by the fan completes an electrical circuit across adjacent elements when the potential is applied.

6. A device according to Claim 5 wherein the mechanism comprises a piezo-electric crystal.

7. A device according to Claim 6 wherein the crystal is a barium titanate crystal.

8. A device for capturing insects substantially as described herein with reference to the accompanying drawings.

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